

COMPRESSION STRUCTURES IN THE LOWER CARBONIFEROUS MIOSPORE *DICTYOTRILETES ADMIRABILIS* PLAYFORD

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ABSTRACT. Specimens of the dispersed miospore species *Dictyotriletes admirabilis* Playford 1963 are described from large spore masses obtained from the Lower Carboniferous of eastern Scotland. *D. admirabilis* is transferred to the genus *Punctatisporites* (Ibrahim) Potonié and Kremp 1954, and compression of sporangial masses is suggested as the mechanism by which the characteristic indentations in the exine were formed.

Dictyotriletes admirabilis was first described by Playford in 1963 from the Horton Group (Mississippian) of eastern Canada. Subsequently a similar but smaller form was recorded by Butterworth and Spinner (1967) from the Lower Carboniferous of north-west England.

Spore masses containing *D. admirabilis* were found in one coal sample by Dr. E. G. Spinner (*pers. comm.* 1970) during an investigation of the Viséan megaspores of East Lothian, Scotland. The sample from which the spore masses were obtained was a thin coal from depth 32 ft 8 in in the Institute of Geological Sciences' Skateraw (1969) borehole, East Lothian. This horizon is approximately two feet below the Mid Skateraw Limestone in the Lower Limestone Group, which in this area is considered to be Upper Viséan in age (Wilson *pers. comm.* in Spinner 1969). Further investigation of the same sample has resulted in the isolation of several more spore masses of the same type, and the isolation of individual spores from some of these masses. The sample was also prepared by standard techniques for dispersed miospores.

SAMPLE PREPARATION

The coal was crushed into small pieces approximately 1 cm in diameter, treated with Schulze solution for 12 hours, washed until neutral, rinsed rapidly with 2% potassium hydroxide solution, and washed again until neutral. The residue was then sieved at 100 B.S. mesh size, and the spore masses picked from the remaining coarse fraction. The spore masses were broken down into small clusters or single spores by repeated treatment with fuming nitric acid for approximately 1 minute, washing until neutral, then application of ultrasonic vibration for approximately 5 seconds. Selected specimens were mounted for scanning electron microscope investigation, and the remaining spores were mounted in glycerine jelly.

The same sample was also prepared by standard dispersed miospore techniques, and permanent scatter mounts using cellosize and Canada balsam were made. All figured specimens are housed in the Micropalaeontology Collection of the University of Sheffield Geology Department. Specimens mounted for scanning electron microscopy are denoted by 'SEM' after the collection reference number. Representative specimens are also deposited in the Institute of Geological Sciences, Leeds.

SYSTEMATIC DESCRIPTIONS

Spore masses containing *D. admirabilis*

Plate 27, fig. 2

Description. Seven specimens were recorded ranging from 500 to 900 μm in longest diameter. All are irregular in shape and are flattened. The constituent miospores are well preserved, and are in close contact with each other. Tapetal material is irregularly distributed between the spores as small spheres up to 8 μm in diameter. The affinity of these spore masses is unknown.

Anteturma SPORITES H. Potonié 1893

Turma TRILETES (Reinsch) Dettmann 1963

Suprasubturma ACAMERATITRILETES Neves and Owens 1966

Subturma AZONOTRILETES (Luber) Dettmann 1963

Infraturma LAEVIGATI (Bennie and Kidston) Potonié and Kremp 1954

Genus PUNCTATISPORITES (Ibrahim) Potonié and Kremp 1954

Type species. *Punctatisporites punctatus* Ibrahim 1933.*Punctatisporites admirabilis* (Playford) comb. nov.

Plate 27, figs. 1, 3, 4, 6, 7

1963 *Dictyotrites admirabilis* Playford p. 29, pl. viii, figs. 5–7.?1967 *Dictyotrites admirabilis* Butterworth and Spinner, pl. 2, fig. 16.*Holotype.* Playford 1963, pl. viii, fig. 5; Horton Group, Nova Scotia (GSC loc. 6400).*Dimensions.* 64 (75) 91 μm , 61 specimens, spore mass B.

Description. Spores radial, trilete. Amb circular to oval or rounded polygonal. Trilete mark often indistinct. Suturæ straight, normally accompanied by low, membranous folds of the exine bordering the suturæ, length one half to two thirds of spore radius. Exine approximately 3 μm thick, finely scabrate. The spores are preserved in large masses, in polar, oblique and lateral compressions. The spore exine is affected by several large, shallow, partially superimposed depressions, which, in clusters of spores, can often be seen to affect two or more adjacent spores. In transmitted light individual depressions are normally seen as either relatively light or dark areas, depending on the focus, separated from each other and from non-depressed areas by well-defined arcuate boundaries. In the scanning electron microscope these arcuate markings, described by Playford (1963, p. 29) as 'thread-like muri' are seen to be low crests between adjacent depressions, or separating depressions from relatively high, non-depressed areas. The radius of curvature of the depressions is never greater than the maximum observed spore radius. Peripheral folding is common.

EXPLANATION OF PLATE 27

Figs. 1–4, 6, 7. *Punctatisporites admirabilis* (Playford) comb. nov. 1, ML849 SEM, $\times 500$. 2, ML850 SEM, spore mass; approx. $\times 100$. 3, ML851, showing abortive spore, $\times 400$. 4, 6, 7, ML852–854, $\times 400$.

Fig. 5. *P. planus* Hacquebard, ML 855; $\times 400$.



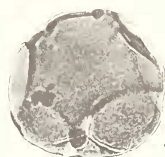
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2



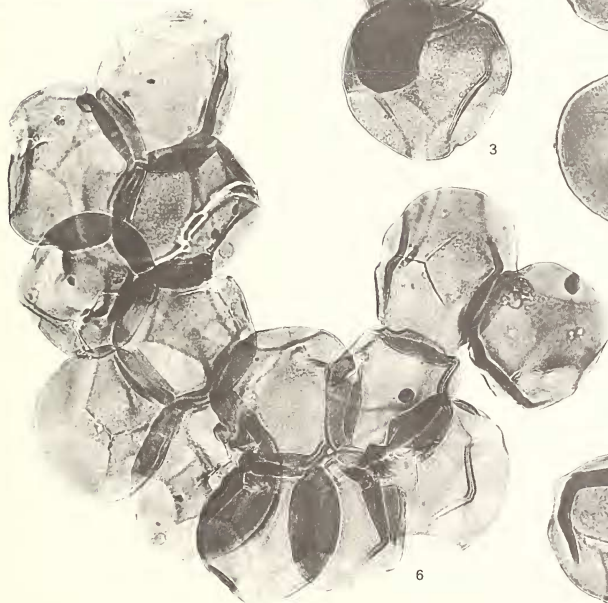
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4



5



6



7

CLAYTON, Lower Carboniferous miospore

